

**WHAT IS CLAIMED IS:**

1. A device for selectively exposing a portion of at least one optical fiber to hydrogen, the article comprising:

a housing defining a chamber, the housing having at least a first optical fiber port coupled to the chamber to receive the portion of the at least one optical fiber, the housing also including a hydrogen input port, and a hydrogen channel extending from the hydrogen input port to the chamber.

2. The device of claim 1, further comprising at least a first sealed end at the first optical fiber port to permit the at least one optical fiber to pass out of the chamber to outside the housing while resisting flow of gas from the chamber to outside the housing.

3. The device of claim 2, wherein the first sealed end includes a first plug, the first plug defining at least one optical fiber passage, each optical fiber passage being configured and arranged to hold at least one optical fiber, the first plug being configured and arranged so that at least a portion of the first plug fits over the first optical fiber port to resist the flow of gas out of the first optical fiber port.

4. The device of claim 3, wherein the first plug comprises a compressible material.

5. The device of claim 3, wherein the first plug defines a plurality of optical fiber passages through the first plug.

6. The device of claim 3, further comprising a first end cap, wherein the first end cap applies pressure against the first plug to facilitate the first plug resisting the flow of gas out of the first optical fiber port.

7. The device of claim 6, wherein the first plug is formed of a compressible material that is deformed by applying pressure from the first end cap to increase a resistance to the flow of gas out of the first optical fiber port.

8. The device of claim 2, further comprising a second optical fiber port and a second sealed end at the second optical fiber port to permit the at least one optical fiber to pass out of the chamber to outside the housing while resisting flow of gas from the chamber to outside the housing.

9. The device of claim 8, wherein the second sealed end includes a second plug, defining at least one optical fiber passage, each optical fiber passage being configured and arranged to hold at least one optical fiber, the second plug being configured and arranged so that at least a portion of the second plug fits over the second optical fiber port to resist the flow of gas out of the second optical fiber port.

10. The device of claim 1, further comprising a heating element disposed over a portion of the housing to heat the portion of the at least one optical fiber disposed within the chamber.

11. The device of claim 10, further comprising a temperature sensor disposed on the housing.

12. The device of claim 1, further comprising a connector extending from the hydrogen input port to provide for connection to a hydrogen supply line.

13. The device of claim 12, further comprising a hydrogen supply coupled to the connector.

14. A method of loading hydrogen into a selected portion of an optical fiber, the method comprising:

disposing the selected portion of the optical fiber in a chamber defined by a housing; and

maintaining hydrogen in the chamber so that the hydrogen loads into the selected portion of the optical fiber in the chamber.

15. The method of claim 14, wherein maintaining the hydrogen in the chamber includes introducing the hydrogen to the chamber via a hydrogen channel defined by the housing and communicating with the chamber.

16. The method of claim 14, further comprising heating the selected portion of the optical fiber while maintaining the hydrogen in the chamber.

17. The method of claim 16, wherein heating the selected portion of the optical fiber comprises positioning a heating device in thermal contact with at least a portion of an exterior of the housing and heating the portion of the exterior of the housing using the heating device.

18. The method of claim 16, further comprising monitoring a temperature while maintaining hydrogen in the chamber using a temperature sensor coupled to measure temperature of one of the housing and an interior of the housing.

19. The method of claim 18, further comprising modifying a temperature of the selected portion of the optical fiber based on the monitored temperature.

20. The method of claim 19, wherein monitoring the temperature includes monitoring a temperature of an exterior surface of the housing and modifying the temperature of the selected portion of the optical fiber includes modifying heat applied to the housing.

21. The method of claim 14, wherein the chamber extends between first and second optical fiber ports defined by the housing and the method further comprises positioning first and second ends over the first and second optical fiber ports, respectively, to reduce leakage of hydrogen from the optical fiber channel through the first and second optical fiber ports.

22. The method of claim 21, wherein the first and second ends comprise at least one optical fiber passage, the optical fiber is one fiber of one or more optical fibers and the method further comprises

threading the one or more optical fibers through one or more of the at least one optical fiber passage of the first end; and

threading the one or more optical fibers through one or more of the at least one optical fiber passage of the second end so that the portion of the optical fiber is disposed in the chamber.

23. The method of claim 21, further comprising applying pressure against the first and second ends to further reduce leakage of hydrogen through the first and second optical fiber ports.

24. The method of claim 23, further comprising seating at least a portion of the first and second ends into the first and second optical fiber ports.

25. The method of claim 24, wherein the first and second ends comprise a compressable material and wherein applying pressure against the first and second ends comprises applying pressure against the first and second ends to compress the first and second ends to further conform the seated portions of the first and second ends to the first and second optical fiber ports.

26. A system for loading hydrogen into a selected portion of an optical fiber, the method comprising:

means for disposing the selected portion of the optical fiber in a chamber defined by a housing; and

means for maintaining hydrogen in the chamber so that the hydrogen loads into the selected portion of the optical fiber in the chamber.